



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant: Tsujimoto et al.
Appl. No.: 09/284,222
Filed: July 22, 1999
Title: NONAQUEOUS-ELECTROLYTE SECONDARY BATTERY
Art Unit: 1745
Examiner: T. Dove
Docket No.: 113184-003

#22
4.11.02A

Assistant Commissioner for Patents
Washington, DC 20231

APPELLANTS' APPEAL BRIEF

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Dear Sir:

This Appeal Brief is submitted in support of the Notice of Appeal filed on January 28, 2002
in the above-identified patent application.

I. REAL PARTY IN INTEREST

The real party in interest for the above-identified patent application on appeal is Sony Corporation by virtue of an Assignment dated June 21 and 22, 1999 and recorded in the United States Patent and Trademark Office.

II. RELATED APPEALS AND INTERFERENCES

Appellants do not believe there are any known appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision with respect to the above-identified Appeal.

III. STATUS OF THE CLAIMS

Claims 7-9 and 12-16 are pending in this Application. A copy of appealed Claims 7-9 and 12-16 is attached hereto as the Appendix. In an Advisory Action dated January 15, 2002, Claims 7-9 and 12-16 are rejected. The Advisory Action refers to the Final Office Action dated August 28, 2001 regarding the reasons for the rejections. As outlined in the Final Office Action, Claims 7-9 and 16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Koichiro* JP 9-213337 ("*Koichiro*") and Claims 12-15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Koichiro* in view of *Abe* et al. JP 4-195201 ("*Abe*").

Copies of the Advisory Action and the Final Office Action are appended hereto as Exhibits A and B, respectively, of the Supplemental Appendix, and a copy of the cited references are located in the Supplemental Appendix as Exhibits C-D.

IV. STATUS OF THE AMENDMENTS

No Amendments After Final were filed.

V. SUMMARY OF THE INVENTION

The summary of the invention on Appeal is provided as follows:

The present invention relates generally to batteries. More specifically, the present invention relates to a nonaqueous electrolyte secondary battery having a large capacity and a low self-discharge ratio.

Appellants have discovered how to produce a secondary battery that contains a nonaqueous electrolyte having a large capacity and low self-discharge (*Fig. 1*). In this regard, Appellants have surprisingly found that a rise in temperature occurring due to an external short circuit can be

prevented when a mix of fluorine polymers and aromatic vinyl-conjugate diene polymers is employed as a binder in an electrode incorporating a carbonaceous material and a collector. (*Specification*, p. 3). When the mix of fluorine polymer and aromatic vinyl-conjugate diene polymer is used as the binder, a capacity required for the battery can be maintained. Moreover, the superior adhesiveness of the aromatic vinyl-conjugate diene polymer contributes to prevention of the rise in temperature. (*Specification*, p. 5).

Appellants have demonstrated that the preferable weight mixture ratio of the fluorine polymer and the aromatic vinyl-conjugate diene polymer ranges from about 1 to about 99 and have further demonstrated that the preferable binder weight percent ranges from about 2 weight percent to about 15 weight percent of the total weight of the negative electrode. (*Specification*, p. 6)

As disclosed in Appellants' Patent Application, Appellants have produced numerous inventive secondary batteries pursuant to the claimed invention. The examples showing in Table 2 are particularly instructive with regard to the binder composition of the present invention. In this regard, Sample 8 (comparative sample) discloses the use of a binder whose total weight percent of the negative electrode is only 1%. The initial capacity and highest temperature at short circuit of Sample 8 are undesirably low. In contrast, Samples 3, 9-11 of Table 2 are inventive examples wherein the binder comprises 2-15% percent weight of the negative electrode. In these inventive examples, the initial capacities and the highest temperatures at short circuit are desirably high. Indeed, comparative Sample 8 demonstrates that the initial capacity and temperature at short circuit become undesirably low when the binder weight falls below 2% of the total composition of the negative electrode. (*Specification*, page 19).

Additionally, in the present invention, the binder for powder contains cellulose derivative to serve as a viscosity bodying agent that additionally assists in preventing a rise in temperature that can occur when an external short circuit takes place. Moreover, the above viscosity bodying agent can improve cycle characteristics even under heavy loads. (*Specification*, p 4).

It is preferable that the ratio of cellulose derivative with respect to the total weight of the negative electrode be not less than 0.1 weight percent and not more than 5 weight percent. If the content of the cellulose derivative is lower than 0.1 weight percent, then it is not possible to achieve a satisfactory cycle characteristic under a heavy load. (*Specification*, p. 8).

The positive electrode used in the present invention has an active material which contains lithium composite oxide. (*Specification*, p. 8)

The nonaqueous electrolyte may be an arbitrary material such as that obtained by dissolving an electrolyte in a solvent, in a material obtained by gelatinizing the electrolyte (*i.e.*, a gel electrolyte), or in a material obtained by swelling a polymer material with the electrolyte (*i.e.*, a solid electrolyte). (*Specification*, p. 8). When a gel electrolyte or a solid electrolyte is employed, a known gelatinizing material or polymer material may be utilized. (*Specification*, p. 9).

VI. ISSUES

The issues on Appeal are as follows:

1. Would the nonaqueous electrolyte secondary battery as defined by Claims 7-9 and 16 have been obvious at the time of the invention to one of ordinary skill in the art under 35 U.S.C. § 103(a) over *Koichiro*?

2. Would the nonaqueous electrolyte secondary battery as defined by Claims 12-15 have been obvious at the time of the invention to one of ordinary skill in the art under 35 U.S.C. § 103(a) over *Koichiro* in view of *Abe*?

VII. GROUPING OF THE CLAIMS

Appellants argue for the patentability of the independent claim in addition to the patentability of the dependent claims together with the independent claim as set forth in detail below pursuant to the requirements of 37 C.F.R. § 1.192(7), unless otherwise specified.

VIII. ARGUMENT

A. The Claimed Invention -- Independent Claim

On Appeal, there is one independent claim, that is, Claim 7. Independent Claim 7 provides as follows:

Independent Claim 7 recites a nonaqueous electrolyte secondary battery comprising a positive electrode; and a negative electrode comprising a binder and an active material, the binder comprising a mixture of a fluorine polymer and an aromatic vinyl-conjugate diene polymer, the active material comprising a carbonaceous material wherein the binder comprises a weight mixture ratio of the fluorine polymer to the aromatic vinyl-conjugate diene polymer that ranges from about 1 to about 99 and wherein the binder comprises from about 2 weight percent to about 15 weight percent of a total weight of the negative electrode.

B. The Rejections

Claims 7-9 and 16 stand rejected under 35 U.S.C. § 103(a) over *Koichiro*.

Claims 12-15 stand rejected under 35 U.S.C. § 103(a) over *Koichiro* in view of *Abe*. In this regard, the Patent Office relies on *Abe* to remedy the deficiencies of *Koichiro*.

Appellants respectfully submit that that the rejections of the Claims should be reversed based on the fact that the Patent Office has failed to establish a *prima facie* case of obviousness.

1. The Applicable Law

35 U.S.C. § 103

The Court of Appeals for the Federal Circuit has held that the legal determination of an obviousness rejection under 35 U.S.C. § 103 is:

whether the claimed invention as a whole would have been obvious to a person of ordinary skill in the art at the time the invention was made...The foundation facts for the *prima facie* case of obviousness are: (1) the scope and content of the prior art; (2) the difference between the prior art and the claimed invention; and (3) the level of ordinary skill in the art...Moreover, objective indicia such as commercial success and long felt need are relevant to the determination of obviousness....Thus, each obviousness determination rests on its own facts.

In re Mayne, 41 U.S.P.Q. 2d 1451, 1453 (Fed. Cir. 1997).

In making this determination, the Patent Office has the initial burden of proving a *prima facie* case of obviousness. *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q. 2d 1955, 1956 (Fed. Cir. 1993). “The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.” *In re Fritch*, 23 U.S.P.Q. 2d 1780, 1783-84 (Fed. Cir. 1992).

Further, the Federal Circuit has held that it is “impermissible to use the claimed invention as an instruction manual or ‘template’ to piece together the teachings of the prior art so that the

claimed invention is rendered obvious.” *In re Fritch*, 23 U.S.P.Q.2d 1780, 1784 (Fed. Cir. 1992).

“One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. *In re Fine*, 837 F.2d 1071 at 1075. (Fed. Cir. 1988).

Moreover, the Federal Circuit has held that “obvious to try” is not the standard under 35 U.S.C. § 103. *Ex parte Goldgaber*, 41 U.S.P.Q.2d 1172, 1177 (Fed. Cir. 1996). “An obvious-to-try situation exists when a general disclosure may pique the scientist curiosity, such that further investigation might be done as a result of the disclosure, but the disclosure itself does not contain a sufficient teaching of how to obtain the desired result, or that the claim result would be obtained if certain directions were pursued.” *In re Eli Lilly and Co.*, 14 U.S.P.Q.2d 1741, 1742 (Fed. Cir. 1990).

“If the examination at the initial stage does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of the patent.” *In re Oetiker*, 24 U.S.P.Q. 2d 1443, 1444 (Fed. Cir. 1992).

2. The Rejection of Claims 7-9 and 16 under 35 U.S.C. § 103(a)
Should Be Reversed Because the Patent Office Has Failed to
Overcome its *Prima Facie* Burden

The Patent Office has failed to overcome its *prima facie* burden with respect to the rejection of Claims 7-9 and 16 under 35 U.S.C. § 103(a). The Patent Office has improperly relied on *Koichiro* to support its obviousness rejection.

Of the pending claims, Claim 7 is the sole independent claim. Claim 7 recites a non-aqueous electrolyte secondary battery that includes, in part, a negative electrode comprising a binder and an active material wherein the binder comprises from about 2 weight percent to about 15 weight percent

of the total weight of the negative electrode. Claims 8, 9 and 16 each depend from independent Claim 7 and therefore as a matter of law incorporate each of the features of independent Claim 7.

According to its Advisory Action, the basis of the Patent Office's § 103 rejection of Claims 7-9 and 16 is that it would have been obvious to one skilled in the art to modify the teachings of *Koichiro* to make a secondary battery having a negative electrode with a binder content of 2-15%. (See Advisory Action dated January 15, 2002).

2004/102 → The Patent Office, however, concedes that the *Koichiro* abstract does not teach a binder content of 2-15% of the negative electrode. Additionally, after allegedly translating the actual *Koichiro* reference from Japanese into English, the Patent Office has failed to point out where the actual reference teaches or suggests a binder content of 2-15% of the negative electrode. In fact, Appellants respectfully contend that the Patent Office has failed to provide any reference demonstrating that it would have been obvious to make a binder content of 2-15%. In this regard, the only basis for the Patent Office's contention is that it would have been obvious to one skilled in the art to do the same.

Appellants respectfully contend that the rejection is improper because "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 23 U.S.P.Q. 2d 1780, 1783-84 (Fed. Cir. 1992)(*emphasis supplied*). In this regard, the patent office has failed to demonstrate how *Koichiro* suggests to one skilled in the art that the binder content of *Koichiro* should or could be modified.

Appellants have surprisingly discovered that varying the content of the binder can have an effect on the properties of the non-aqueous electrolyte secondary battery of the present invention.

As disclosed in Appellants' Patent Application, Appellants have produced numerous inventive secondary batteries pursuant to the claimed invention. The examples showing in Table 2 are particularly instructive with regard to the binder composition of the present invention.

In this regard, Sample 8 (comparative sample) discloses the use of a binder whose total weight percent of the negative electrode is only 1%. The initial capacity and highest temperature at short circuit of Sample 8 are undesirably low. In contrast, Samples 3, 9-11 of Table 2 are inventive examples wherein the binder comprises 2-15% percent weight of the negative electrode. In these inventive examples, the initial capacities and the highest temperatures at short circuit are desirably high. Indeed, comparative Sample 8 demonstrates that the initial capacity and temperature at short circuit become undesirably low when the binder weight falls below 2% of the total composition of the negative electrode. (*Specification*, page 19).

Appellants respectfully submit that neither *Koichiro* nor the general state of knowledge in the battery-making art would have led one skilled in the art to arrive at the 2-15% binder content as required by the claimed invention. In this regard, the Patent Office merely asserts, without any apparent support, that the binder weight percentage feature of the claimed invention would be obvious to one of ordinary skill in the art.

Appellants respectfully submit that the mere conclusory statements with respect to *Koichiro* are insufficient to overcome its *prima facie* burden. Of course, it is "impermissible to use the claimed invention as an instruction manual or template to piece together the teachings of the prior art so that the claimed invention is rendered obvious." *In re Fritch*, 23 USPQ 2d 1780, 1784 (Fed. Cir. 1992). Although one of skill in the art might find it "obvious to try" the binder weight percentage features of the claimed invention, an "obvious to try" analysis is not the proper standard

under 35 U.S.C. §103. *In re Geiger*, 2 USPQ 2d 1276, 1278 (Fed. Cir. 1987). Indeed, an "obvious to try" test would often deny patent protection to inventions growing out of well-planned research which is, of course, guided into those areas in which success is deemed most likely. *In re Lindell*, 155 USPQ 521, 523 (C.C.P.A. 1967).

As previously discussed, Appellants have surprisingly discovered that a non-aqueous electrolyte secondary battery that has a binder weight percentage ranging from about 2% to about 15% exhibits enhanced properties including, for example, capacity and short circuit temperature as disclosed in the specification on pages 19-21. Appellants believe that nowhere does *Koichiro* teach or suggest the specific binder weight percentage features of the claimed invention, let alone recognize the beneficial effects with respect to such features. Therefore, Appellants do not believe that one skilled in the art would be inclined to modify *Koichiro* to arrive at the claimed invention.

Based on the apparent differences between the claimed invention and *Koichiro*, Appellants respectfully submit that *Koichiro* fails to teach or suggest a number of features of the claimed invention. Therefore, Appellants respectfully submit that *Koichiro* fails to render obvious the claimed invention as required by Claims 7-9 and 16. Accordingly, Appellants respectfully request that this rejection be reversed.

4. The Rejection of Claims 12-15 under 35 U.S.C. § 103(a) Should Be Reversed Because the Patent Office Has Failed to Overcome its *Prima Facie* Burden

Appellants respectfully submit that that the rejection of Claims 12-15 under 35 U.S.C. § 103(a) should be reversed based on the fact that the Patent Office has failed to establish a *prima facie* case of obviousness. The Patent Office relies on *Abe* to remedy the deficiencies of *Koichiro*.

Appellants submit that this rejection is improper. Claims 12-15 depend from independent Claim 1 and therefore as a matter of law incorporate each feature of independent Claim 7. As previously discussed, *Koichiro* fails to teach or suggest a number of features, such as the 2-15% binder content in the negative electrode, as required by independent Claim 7. Further, *Abe* cannot remedy the deficiencies of *Koichiro*. The Patent Office merely relies on *Abe* for its teaching regarding the cellulose derivative and carbonaceous material features of Claims 12-15.

Further, Appellants respectfully submit that the Patent Office cannot rely solely on *Abe* to remedy the deficiencies of *Koichiro*. In this regard, the Patent Office merely relies on *Abe* for its alleged teachings with respect to the cellulose derivative and carbonaceous material features of Claims 12-15. Moreover, nowhere does *Abe* teach or suggest the binder weight percentage features of the claimed invention.

Based on the fact that *Koichiro* and *Abe*, even if combinable, fail to teach or suggest a number of features of the claimed invention, Appellants respectfully submit that these references, alone or even if combinable, fail to render obvious the claimed invention. Accordingly, Appellants respectfully request that this rejection be reversed.

IX. CONCLUSION

Appellants submit that the Patent Office has failed to overcome its *prima facie* burden with respect to the rejections of Claims 7-9 and 12-16 under 35 U.S.C. § 103(a). Accordingly, Appellants respectfully submit that the rejections of the pending claims are erroneous in law and in fact and should therefore be reversed by this Board.

Respectfully submitted,



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Thomas C. Basso
BELL, BOYD & LLOYD LLC
P.O. Box 1135
Chicago, Illinois 60690-1135
Telephone: (312) 807-4310

ATTORNEYS FOR APPELLANTS

APPENDIX

7. A nonaqueous electrolyte secondary battery comprising:

a positive electrode; and

5 a negative electrode comprising a binder and an active material, the binder comprising a mixture of a fluorine polymer and an aromatic vinyl-conjugate diene polymer, the active material comprising a carbonaceous material wherein the binder comprises a weight mixture ratio of the fluorine polymer to the aromatic vinyl-conjugate diene polymer that ranges from about 1 to about 99 and wherein the binder comprises from about 2 weight percent to about 10 15 weight percent of a total weight of the negative electrode.

8. The nonaqueous electrolyte secondary battery of Claim 7, wherein the fluorine polymer comprises at least one material selected from the group consisting of polyvinylidene fluoride, polytetrafluoroethylene and fluorine rubber.

15 9. The nonaqueous electrolyte secondary battery of Claim 7 wherein the aromatic vinyl-conjugate diene polymer comprises styrene-butadiene latex.

12. The nonaqueous electrolyte secondary battery of Claim 7 wherein the binder comprises a cellulose derivative as a viscosity reducing agent.

13. A nonaqueous electrolyte secondary battery according to claim 12, wherein a ratio 20 of said cellulose derivative with respect to total weight of said negative electrode is not less than 0.1 wt% nor more than 5 wt%.

14. A nonaqueous electrolyte secondary battery according to claim 7, wherein said carbonaceous material is a non-graphitizing carbon material.

15. A nonaqueous secondary battery according to claim 7, wherein said carbonaceous material is graphite.

16. A nonaqueous electrolyte secondary battery according to Claim 7, wherein Li_xMO_2 is contained as an active material for said positive electrode where M is one or more
5 types of transition metals and $0.05 \leq x \leq 1.10$.